

FORM PTO-1390
REV. 5-93US DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICEATTORNEYS DOCKET NUMBER
P00,0316**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)

09/485662 ✓INTERNATIONAL APPLICATION NO.
PCT/DE97/01750INTERNATIONAL FILING DATE
14 August 1997 ✓PRIORITY DATE CLAIMED
14 August 1997 ✓

TITLE OF INVENTION

METHOD AND SYSTEM FOR LOGGING ON A MOBILE UNIT AT A FIXED STATION ✓

APPLICANT(S) FOR DO/EO/US

Jurgen Kockmann et al. ✓

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay.
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2))
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98; (PTO 1449, Prior Art, Search Report)
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:
 - a. ☒ Submission of Drawings - Figs. 1-4 on two sheets
 - b. ☒ EXPRESS MAIL #EL393830160US dated 2-14-2000

U.S. APPLICATION NO. **09/485662**INTERNATIONAL APPLICATION NO
PCT/DE97/01750ATTORNEY'S DOCKET NUMBER
P00,031617. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5):**

Search Report has been prepared by the EPO or JPO \$840.00

International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) .. \$720.00

No international preliminary examination fee paid to USPTO (37 C.F.R. 1.482) but
international search fee paid to USPTO (37 C.F.R. 1.445(a)(2)) \$790.00Neither international preliminary examination fee (37 C.F.R. 1.482) nor international
search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO \$1070.00International preliminary examination fee paid to USPTO (37 C.F.R. 1.482) and all
claims satisfied provisions of PCT Article 33(2)-(4) \$ 98.00**ENTER APPROPRIATE BASIC FEE AMOUNT =**

CALCULATIONS

PTO USE ONLY

\$ 840.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 C.F.R. 1.492(e)).

\$

Claims

Number Filed

Number
Extra

Rate

Total Claims

13 - 20 =

X \$ 18.00

\$

Independent Claims

2 - 3 =

X \$ 78.00

\$

Multiple Dependent Claims

\$260.00 +

\$

TOTAL OF ABOVE CALCULATIONS =

\$840.00

Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also
be filed. (Note 37 C.F.R. 1.9, 1.27, 1.28)

\$

SUBTOTAL =

\$ 840.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months
from the earliest claimed priority date (37 CFR 1.492(f)).

+

\$

TOTAL NATIONAL FEE =

\$ 840.00

Fee for recording the enclosed assignment (37 C.F.R. 1.21(h). The assignment must be
accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). \$40.00 per property

+

\$

TOTAL FEES ENCLOSED =

\$ 840.00

Amount to be
refunded

\$

charged

\$

a. ☒ A check in the amount of \$ 840.00 to cover the above fees is enclosed.b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 08-2290. A duplicate copy of this sheet is enclosed.NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be
filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Hill & Simpson
A Professional Corporation
85th Floor Sears Tower
Chicago, Illinois 60606

SIGNATURE

William E. Vaughan

NAME

39,056

Registration Number

BOX PCT

IN THE UNITED STATES DESIGNATED/ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

PRELIMINARY AMENDMENT

APPLICANTS: Jurgen Kockmann et al. DOCKET NO: P00,0316

SERIAL NO: GROUP ART UNIT:

EXAMINER:

10

INTERNATIONAL APPLICATION NO: PCT/DE97/01750

INTERNATIONAL FILING DATE: 14 August 1997

INVENTION: **METHOD AND SYSTEM FOR LOGGING ON A MOBILE
UNIT AT A FIXED STATION**

Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

Please amend the above-identified International Application before
entry into the National stage before the U.S. Patent and Trademark Office
under 35 U.S.C. §371 as follows:

In The Specification:

On page 1, cancel lines 1-3 and substitute therefor:

--S P E C I F I C A T I O N**TITLE**

**METHOD AND SYSTEM FOR LOGGING ON A MOBILE UNIT
AT A FIXED STATION**

BACKGROUND OF THE INVENTION**Field of the Invention--.**

30

On page 1, lines 4-5, cancel "an arrangement and".

On page 1, line 5, insert --and system-- after "method".

On page 1, line 7, cancel "are" and substitute therefor --is--.

On page 1, line 8, cancel "plurality" and substitute therefor --number-

-.

On page 1, before line 11, insert the following left-hand justified heading:

--Description of the Prior Art--.

On page 1, line 18, cancel the "," and substitute therefor a --;--.

On page 1, line 18, insert a --,-- after "i.e.".

On page 1, line 18, insert a --,-- after "particular".

On page 1, line 19, insert a --,-- after "is".

On page 1, line 19, insert a --,-- after "therefore".

On page 1, line 19, cancel "terms" and substitute therefor --context--.

On page 1, line 20, cancel "description" and substitute therefor --invention--.

On page 1, line 21, cancel the "," after "on".

On page 1, line 22, cancel the "," after "on".

On page 1, line 22, cancel ", so that" and substitute therefor --. As such,--.

On page 1, line 23, cancel "said" and substitute therefor --, the--.

On page 1, lines 23-24, cancel ", in particular,".

On page 1, line 25, insert --as well-- after "station" and before the ".".

On page 1, lines 30-31, cancel "to be understood here as".

On page 1, line 31, cancel "plurality" and substitute therefor --number--.

On page 1, line 32, cancel "is" and substitute therefor --are--.

On page 1, line 33, cancel the "," and substitute therefor a --;--.

On page 1, line 34, insert a --,-- after "example".

On amended page 2, line 3, insert a --,-- after "and".

On amended page 2, line 3, insert a --,-- after "thus".

On amended page 2, line 4, insert --particularly-- before "important".

On amended page 2, line 4, cancel "in particular".

On amended page 2, line 5, insert a --,-- after "band".

On amended page 2, line 6, cancel the ",".

On amended page 2, line 12, cancel "which" and substitute therefor
--what the--.

On amended page 2, line 16, insert a --,-- after "and".

On amended page 2, line 17, insert a --,-- after "particular".

On amended page 2, line 18, insert a --,-- after "is".

On amended page 2, line 18, insert a --,-- after "fact".

On amended page 2, line 19, cancel the "," and substitute therefor
a --;--.

On amended page 2, line 19, insert a --,-- after "i.e.".

On amended page 2, line 22, cancel "an arrangement" and
substitute therefor --system--.

On amended page 2, line 23, cancel "plurality" and substitute
therefor --number--.

On amended page 2, line 24, cancel ", in which" and substitute
therefor --. In this--.

On amended page 2, line 24, cancel "arrangement" and substitute
therefor --system,--.

On amended page 2, line 26, cancel "comprise" and substitute
therefor --include--.

On amended page 2a, line 1, cancel "The" and substitute therefor
--An--.

On amended page 2a, line 1, cancel "here" and substitute therefor
--, therefore,--.

On amended page 2a, line 1, cancel "an arrangement" and
substitute therefor --system--.

On amended page 2a, line 2, cancel “, which method and arrangement enable”.

On amended page 2a, line 3, insert --is enabled-- after “unit”.

On amended page 2a, line 4, cancel “are” and substitute therefor --is--.

On amended page 2a, line 4, cancel “plurality” and substitute therefor --number--.

On amended page 2a, before line 7, insert the following centered heading:

--SUMMARY OF THE INVENTION--

On amended page 2a, line 7, insert --present-- before “invention”.

On amended page 2a, line 7, cancel “means of”.

On page 3, line 1, cancel “are” and substitute therefor --is--.

On page 3, line 2, cancel “plurality” and substitute therefor --number--.

On page 3, line 5, insert --present-- before “invention”.

On page 3, line 6, cancel “indicate” and substitute therefor --indicates--.

On page 3, line 8, cancel “are” and substitute therefor --is--.

On page 3, line 11, cancel “by means of” and substitute therefor --via--.

On page 3, line 12, cancel “, of course,”.

On page 3, line 13, cancel the “,” after “known”.

On page 3, line 15, cancel “, as” and substitute therefor --. As--.

On page 3, line 16, cancel “of which” and substitute therefor a --,--.

On page 3, line 19, cancel “, in particular,”.

On page 3, line 23, cancel “can”.

On page 3, line 23, insert --can-- after “then”.

On page 3, line 25, cancel "by means of" and substitute therefor --
via--.

On page 3, line 26, cancel "can".

On page 3, line 26, insert --can-- after "then".

On page 3, line 29, cancel "plurality" and substitute therefor --
number--.

On page 3, include the paragraph which begins on line 31 in the
paragraph which ends on line 30.

On page 3, line 31, insert a --,-- after "determined".

On page 3, line 32, cancel "by means of" and substitute therefor a
--,--.

On page 3, line 33, cancel "plurality" and substitute therefor --
number--.

On page 3, line 37, cancel "is".

On page 3, line 37, insert --is-- after "also".

On page 4, line 3, insert a --,-- after "that".

On page 4, line 3, cancel "logging on" and substitute therefor --
logging-on--.

On page 4, line 3, insert a --,-- after "mode".

On page 4, line 5, cancel the ", ".

On page 4, include the paragraph which begins on line 8 in the
paragraph which ends on line 7.

On page 4, include the paragraph which begins on line 10 in the
paragraph which ends on line 9.

On page 4, line 10, cancel "The" and substitute therefor --Also, the--.

On page 4, line 11, insert a --,-- after "and".

On page 4, line 11, insert a --,-- after "particular".

On page 4, line 12, insert --present-- before "invention".

On page 4, lines 12-13, cancel "an arrangement" and substitute therefor --a system--.

On page 4, line 16, cancel "plurality" and substitute therefor --number--.

On page 4, line 22, cancel "indicate" and substitute therefor --indicates--.

On page 4, lines 26--27, cancel "by means of" and substitute therefor --via--.

On page 4, include the paragraph which begins on line 28 in the paragraph which ends on line 27.

On page 4, line 28, cancel "As" and substitute therefor --In--.

On page 4, line 28, insert --embodiment-- after "alternative".

On page 4, line 28, cancel "can".

On page 4, line 28, insert --can-- after "also".

On page 4, line 31, cancel "As" and substitute therefor --In yet--.

On page 4, line 31, cancel "alternative" and substitute therefor --embodiment--.

On page 4, line 37, cancel "said" and substitute therefor --the--.

On page 4, line 39, cancel "do" and substitute therefor --does--.

On page 5, line 4, cancel ", this" and substitute therefor --. This--.

On page 5, line 4, cancel "being" and substitute therefor --is--.

On page 5, line 13, cancel "are" and substitute therefor --is--.

On page 5, include the paragraph which begins on line 15 in the paragraph which ends on line 14.

On page 5, line 16, cancel "are" and substitute therefor --is-- (occurs twice).

On page 5, line 17, cancel "plurality" and substitute therefor --number--.

On page 5, line 18, cancel "have" and substitute therefor --has--.

On page 5, line 19, cancel "go" and substitute therefor --goes--.

On page 5, line 19, cancel "indicate" and substitute therefor --indicates--.

On page 5, include the paragraph which begins on line 21 in the paragraph which ends on line 20.

On page 5, line 21, cancel "The" and substitute therefor --In addition, the--.

On page 5, line 22, cancel "by means of" and substitute therefor --via--.

On page 5, cancel lines 24-26 and substitute the following therefor:
--Additional features and advantages of the present invention are described in, and will be apparent from, the Detailed Description of the Preferred Embodiments and the Drawings.

DESCRIPTION OF THE DRAWINGS--.

On page 5, line 27, cancel "an arrangement according to" and substitute therefor --a system of--.

On page 5, line 28, insert --present-- before "invention".

On page 5, line 29, cancel the "," and substitute therefor a --;--.

On page 5, line 32, cancel the "," and substitute therefor a --;--.

On page 5, line 34, cancel "according to" and substitute therefor --for a carrier frequency in accordance with--.

On page 5, line 34, insert --present-- before "invention".

On page 5, lines 34-35, cancel ", for a carrier frequency," and substitute therefor a --;--.

On page 6, before line 3, insert the following centered heading:

--DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS--.

On page 6, line 4, cancel "arrangement" and substitute therefor --system--.

On page 6, line 4, insert --present-- before "invention".

On page 6, line 5, cancel “firstly” and substitute therefor --first--.

On page 6, line 6, cancel “customary” and substitute therefor -- known--.

On page 6, line 6, cancel “the arrangement” and substitute therefor --a system--..

On page 6, line 9, cancel "here".

On page 6, line 11, cancel "by means of" and substitute therefor --
via--.

On page 6, line 19, cancel "by means of" and substitute therefor --
via--.

On page 6, line 21, cancel "plurality" and substitute therefor -- number--.

On page 6, line 22, cancel the “.”.

On page 6, line 23, cancel "the processor 15" and substitute therefor --it--.

On page 6, line 35, cancel the “,” and substitute therefor --wherein--.

On page 6, line 36, cancel "being" and substitute therefor --is--.

On page 6, line 37, cancel “by means of” and substitute therefor --
via--.

On page 6, line 38, cancel "being" and substitute therefor --is--.

On page 7, line 6, cancel “essentially” and substitute therefor --
substantially--.

On page 7, line 8, cancel “to say” and substitute therefor a --,--.

On page 7, line 9, insert --present-- before "invention".

On page 7, lines 11-12, cancel "by means of one, or alternatively by means of a plurality" and substitute therefor --via either one or a number--.

On page 7, line 18, insert --the-- before “values”.

On page 7, line 31, cancel the “.”.

On page 7, line 31, insert a --,-- after "or".

On page 7, line 31, cancel "plurality" and substitute therefor --number--.

On page 7, line 37, insert a --,-- after "is".

On page 7, line 37, insert a --,-- after "course".

On page 8, line 3, cancel "are" and substitute therefor --is--.

On page 8, line 4, cancel "plurality" and substitute therefor --number-

-.

On page 8, line 5, cancel the "," and substitute therefor a --(--.

On page 8, line 6, insert a --)-- after "illustrated".

On page 8, line 8, cancel "plurality" and substitute therefor --number-

-.

On page 8, line 8, cancel the "," and substitute therefor a --(--.

On page 8, line 9, insert a --)-- after "illustrated" and before the ".".

On page 8, line 9, cancel "the case illustrated" and substitute therefor --Fig. 2--.

On page 8, line 24, cancel "is".

On page 8, line 24, insert --is-- after "also".

On page 8, lines 24-25, cancel "in particular".

On page 8, line 35, insert --present-- before "invention".

On page 8, line 36, cancel the "," and substitute therefor a --;--.

On page 8, line 36, insert a --,-- after "i.e.".

On page 8, lines 36-37, cancel "plurality" and substitute therefor --number--.

On page 8, line 37, cancel the ",".

On page 8, line 37, cancel "that".

On page 9, line 1, cancel "are" and substitute therefor --be--.

On page 9, line 5, cancel "comprise, for example," and substitute therefor --include--.

On page 9, line 7, insert a --,-- after "and".

00760 "450" 450

On page 9, line 7, insert a --,-- after "consequently".

On page 9, line 23, cancel "by means of" and substitute therefor --
via--.

On page 9, line 25, insert "then" before "can".

On page 9, line 26, cancel "then".

On page 9, line 30, insert --present-- before "invention".

On page 9, line 33, cancel "may".

On page 9, line 33, insert --may-- after "also".

On page 9, line 34, insert a --,-- after "1".

On page 9, line 34, insert a --,-- after "therefore".

On page 10, line 3, insert --particular-- before "problem".

On page 10, line 3, cancel "in particular".

On page 10, line 4, inset --first-- before "is".

On page 10, line 4, cancel "first".

On page 10, line 5, cancel the ",", and substitute therefor a --;--.

On page 10, line 5, insert a --,-- after "i.e.".

On page 10, line 9, cancel the ",".

On page 10, line 14, cancel "said" and substitute therefor --the--.

On page 10, line 17, insert --present-- before "invention".

On page 10, line 20, cancel "are" and substitute therefor --is--.

On page 10, line 21, cancel the "," after "data" and substitute therefor
a --;--.

On page 10, line 21, insert a --,-- after "i.e.".

On page 10, line 21, insert a --,-- after "example".

On page 10, line 22, cancel "represent" and substitute therefor --
represents--.

On page 10, line 25, cancel "are" and substitute therefor --is--.

On page 10, line 28, cancel "plurality" and substitute therefor --
number--.

On page 10, line 32, cancel "identify" and substitute therefor --identifies--.

On page 10, line 34, cancel "are" and substitute therefor --is--.

On page 10, line 34, cancel "indicate" and substitute therefor --indicates--.

On page 10, line 37, cancel "are" and substitute therefor --is--.

On page 10, line 38, cancel "refer" and substitute therefor --refers--.

On page 10, line 39, cancel "refer" and substitute therefor --refers--.

On page 11, line 1, cancel "are" and substitute therefor --is--.

On page 11, include the paragraph which begins on line 3 in the paragraph which ends on line 2.

On page 11, line 3, cancel "can".

On page 11, line 3, insert --can-- after "also".

On page 11, line 15, cancel "do" and substitute therefor --does--.

On page 11, line 19, cancel ", this" and substitute therefor --. This--.

On page 11, line 19, cancel "being" and substitute therefor --is then--.

On page 11, line 30, cancel "therefore".

On page 11, line 32, cancel ", said" and substitute therefor --. This--.

On page 11, lines 32, 33, cancel "prescribing" and substitute therefor --prescribes--.

On page 11, line 35, insert a --,-- after "addition".

On page 11, line 35, cancel "therefore".

On page 11, line 38, insert --then-- after "11".

On page 11, line 38, insert a --,-- after "is".

On page 11, line 39, cancel "then" and substitute therefor a --,--.

On page 12, line 2, cancel "by means of" and substitute therefor --via--.

On page 12, lines 6-7, cancel "therefore".

5

On page 12, line 9, cancel the “,”.

On page 12, line 12, insert a --,-- after “is”.

On page 12, line 12, insert a --,-- after “therefore”.

On page 12, line 13, cancel “then”.

On page 12, line 15, cancel the “,” and substitute therefor a --;--.

On page 12, line 15, insert a --,-- after “namely”.

On page 12, line 21, cancel “, this” and substitute therefor --. This--.

On page 12, line 21, cancel “being” and substitute therefor --is,--.

On page 12, line 21, insert a --,-- after “namely”.

On page 12, line 27, cancel the “,” and substitute therefor a --;--.

On page 12, line 27, insert a --,-- after “is”.

On page 12, line 31, cancel “Firstly” and substitute therefor --First--.

On page 12, line 34, insert a --,-- after “4”.

On page 12, line 36, cancel “will”.

On page 12, line 36, insert --will-- after “now”.

On page 13, line 5, cancel “arrangement” and substitute therefor --
system--.

On page 13, line 17, insert --not,-- after “is”.

On page 13, line 18, cancel “not” and substitute therefor a --,--.

On page 13, line 19, insert --is-- after “but”.

On page 13, lines 22-23, cancel “, of course, large” and substitute
therefor --great--.

On page 13, line 24, cancel “have”.

On page 13, line 24, insert --have-- after “already”.

On page 13, line 29, cancel the “,” and substitute therefor --which is--

On page 14, line 9, cancel “, as stated above,”.

On page 14, lines 15-16, cancel “, although” and substitute therefor
-- . This is so even though--.

On page 14, line 31, cancel "thus".

On page 14, line 32, cancel "can".

On page 14, line 33, insert --can-- after "also".

On page 14, line 36, cancel the "," after "out".

On page 14, line 37, cancel "infringing" and substitute therefor --impinging upon--.

On page 15, line 7, insert --present-- before "invention".

On page 15, after line 11, insert the following paragraph:

--Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.--

On page 16, cancel all lines of text.

On page 20, (last page) cancel lines 1-4 and substitute the following centered heading therefor:

--ABSTRACT OF THE DISCLOSURE--.

On page 20, line 5, cancel "arrangement" and substitute therefor --A method and system--.

On page 20, line 6, cancel "(2, 3, 11)".

On page 20, line 6, cancel "(1)".

On page 20, line 7, cancel "(Zx)".

On page 20, line 7, cancel "plurality" and substitute therefor --number--.

On page 20, line 8, cancel "(f_x). The" and substitute therefor --with--.

On page 20, line 8, cancel "(1)".

On page 20, line 9, cancel "(11)".

On page 20, line 9, cancel "comprise here" and substitute therefor --respectively include both--.

On page 20, line 9, cancel "(12, 13)".

On page 20, line 11, cancel "(f_x)".
On page 20, line 11, cancel "(Zx)".
On page 20, line 13, cancel "(4, 5)".
On page 20, line 14, cancel "(Zx)".
On page 20, line 14, cancel "(f_x)".
On page 20, line 15, cancel "(Zx)".
On page 20, line 16, cancel "(12, 13)".
On page 20, cancel line 17.

In the Claims:

On amended page 17, cancel line 1 and substitute the following left-hand justified heading therefor:

--We Claim As Our Invention--

Please cancel claims 1-12, without prejudice, and substitute the following claims therefor:

13. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio, the method comprising the steps of:

transmitting the data in time slots on a plurality of carrier frequencies;

broadcasting check data, via the fixed station, which indicates a position of a carrier frequency of a current time slot in a predetermined sequence;

determining, via the mobile unit, the position of the carrier frequency of the current time slot in the predetermined sequence via the check data; and

changing the carrier frequency, via both the mobile unit and the fixed station, after a predetermined time period in accordance with the predetermined sequence.

14. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio as claimed in claim 13, the method further comprising the step of:

transmitting, automatically, the check data during a logging-on mode.

15. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio as claimed in claim 13, the method further comprising the step of:

selecting one of a plurality of predetermined sequences, in order to define the carrier frequency change, wherein the check data broadcast by the fixed station continues to indicate which of the plurality of predetermined sequences is used by the fixed station.

16. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio as claimed in claim 15, the method further comprising the step of:

determining the predetermined sequences via an algorithm.

17. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio as claimed in claim 13, the method further comprising the steps of:

sensing which of the plurality of carrier frequencies is subject to interference; and

using, during the logging-on of the mobile unit, a carrier frequency which is prescribed by the predetermined sequence if the carrier frequency prescribed by the predetermined sequence is passed over.

18. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio as claimed in claim 13, the method further comprising the step of:

using the 2.4 GHz ISM frequency band for transmission.

19. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio as claimed in claim 13, wherein the number of available carrier frequencies is at least 75.

20. A method for logging-on a mobile unit at a fixed station for a transmission of data by radio as claimed in claim 13, wherein the number of available carrier frequencies is 96.

21. A system for wire-free transmission of data between a mobile unit and a fixed station in time slots on a plurality of carrier frequencies, the system comprising:

a fixed station, the fixed station including a fixed station output device for outputting a predetermined sequence which prescribes the carrier frequencies of the time slots wherein the carrier frequency changes after a predetermined time period, and further including a fixed station HF module for transmitting the data in the time slots whose carrier frequencies are each prescribed by the fixed station output device via the predetermined sequence; and

a mobile unit, the mobile unit including a mobile unit output device for outputting a predetermined sequence which prescribes the carrier frequencies of the time slots wherein the carrier frequency changes after the predetermined time period, a further including a mobile unit HF module for transmitting the data in the time slots whose carrier frequencies are each prescribed by the mobile unit output device via the predetermined sequence;

wherein the data transmitted by the fixed station includes check data which indicates a position of the carrier frequency of the current time slot in the predetermined sequence.

5 22. A system for wire-free transmission of data between a mobile unit and a fixed station as claimed in claim 21, the system further comprising:

10 a switching device in the fixed station for switching over between a logging-on mode and a normal transmission mode, wherein the check data is transmitted automatically if the switching device is switched to the logging-on mode.

15 23. A system for wire-free transmission of data between a mobile unit and a fixed station as claimed in claim 21, wherein each of the fixed station output device and the mobile unit output device respectively includes a plurality of predetermined sequences such that the check data continues to contain data which indicates the sequence currently in use by the fixed station.

20 24. A system for wire-free transmission of data between a mobile unit and a fixed station as claimed in claim 21, the system further comprising:

25 processor devices in each of the fixed station output device and the mobile unit output device which respectively calculate the predetermined sequence via an algorithm.

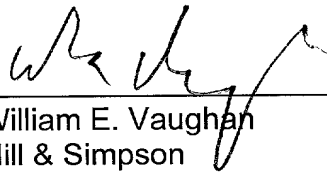
25 25. A system for wire-free transmission of data between a mobile unit and a fixed station as claimed in claim 21, wherein the plurality of carrier frequencies lie in a 2.4 GHz ISM radio band.

REMARKS

5 The present amendment makes editorial changes and corrects
typographical errors in the specification in order to conform the specification
to the requirements of the United States Patent practice. No new matter is
added thereby. Original claims 1-12 have been canceled in favor of new
claims 13-25. However, claims 13-25 have been presented solely because
the revisions by bracketing and underlining which would have been
necessary in claims 1-12 in order to conform those claims to the
requirements of United States Patent practice would have been too
extensive, and thus would have been too burdensome. The cancellation of
claims 1-12 does not constitute an intent on the part of the Applicants to
surrender any of the subject matter of claims 1-12.

Early consideration on the merits is respectfully requested.

Respectfully submitted,



(Reg.No. 39,056)

William E. Vaughan
Hill & Simpson
A Professional Corporation
85th Floor Sears Tower
Chicago, Illinois 60606
(312) 876-0200
Attorneys for Applicants

Description

416 Rec'd PCT/PTO 14 FEB 2000

Method and arrangement for logging on a mobile unit at a fixed station

5 The present invention relates to an arrangement and a method for logging on a mobile unit at a fixed station for a transmission of data by radio, in which transmission the data are transmitted in time slots on a plurality of carrier frequencies and the carrier frequency is changed from one time slot to the next in
10 accordance with a predetermined sequence.

In the majority of cordless telephones currently available on the market, it is possible to serve more than one mobile unit from a fixed station. Often, a cordless telephone system is retrofitted by adding a
15 further mobile unit to the already existing mobile unit or units. For this purpose, the new mobile unit must be logged on in the already existing cordless telephone system, i.e. in particular at the fixed station. Logging on is therefore to be understood within the terms of the
20 present description to mean that a mobile unit, in particular a further mobile unit, is logged on, in the sense of signing on, at the fixed station, so that once logging on has taken place said mobile unit can transmit, in particular, voice information data to the fixed
25 station and receive it from the fixed station.

Problems are experienced if a so-called frequency hopping spread spectrum system is used as air interface and a mobile unit, in particular a further mobile unit, is to be integrated into such a system. A frequency
30 hopping spread spectrum system is to be understood here as a system in which a plurality of carrier frequencies is available for transmitting data by radio and the carrier frequency used is changed from time to time, for example after each time slot or frame of the
35 transmission. In particular, in a time division multiplex system (TDMA), the carrier frequency can be changed after each time slot or time frame of the time division

004630 2333460

multiplex transmission. Such a frequency hopping spread spectrum system has advantages to the extent that the energy of the entire radio transmission is distributed over all the carrier frequencies and thus one single carrier frequency less is loaded. This is important in particular if a generally available frequency band, such as the 2.4
5 0Hz 1524 (Industrial Scientific Medical) band is used in which an upper limit for the maximum energy occurring per carrier frequency is prescribed, in order to keep interference with other subscribers as low as possible.

10 A further advantage of the frequency hopping spread spectrum system is that the provision of a large number of carrier frequencies makes the system less susceptible to interference. Furthermore, the protection of the system against listening in by third parties is increased, since the third party does not usually know which carrier frequency is being changed to after a certain time period.

15 Even if a frequency hopping spread spectrum system has the abovementioned advantages, there is still the problem of synchronizing the carrier frequencies and in particular of changing the carrier frequencies when logging on a new mobile unit at a fixed station. It is in fact a precondition of logging on that the mobile unit to be logged on is capable of communicating with the fixed station, i.e. can precisely
20 perform the change of carrier frequency.

WO 95/06377 teaches a method and an arrangement for transmitting data wirelessly between a mobile unit and a fixed station in time slots on a plurality of carrier frequencies, in which method and arrangement the carrier frequencies of a
25 predetermined time period are changed in accordance with a predetermined sequence. To accomplish this, the mobile unit and the fixed station each comprise a device for outputting the predetermined sequence and an HF module for transmitting the data in the time slots.

2a

This object is achieved according to the invention by means of a method for logging on a mobile unit at a fixed station for a transmission of data by radio, in

[illegible]

which transmission the data are transmitted in time slots on a plurality of carrier frequencies (TDMA system) and the carrier frequency is changed, for example, from one time slot to the next time slot in accordance with a predetermined sequence. According to the invention, check data which indicate the position of the carrier frequency of the current (instantaneously broadcast) time slot in the predetermined sequence are broadcast by the fixed station. The mobile unit can then determine the position of the carrier frequency of the current time slot in the predetermined sequence by means of the check data. The mobile unit to which, of course, the entire sequence is known, can then determine, on the basis of the position of the carrier frequency in the predetermined sequence, the carrier frequency which is to be changed to next, as a result of which synchronization of the change of the carrier frequency of the mobile unit with that of the fixed station is achieved.

The check data can, in particular, be transmitted only during a logging-on mode. After the logging-on mode has been terminated, normal transmission of, for example, voice information data between the mobile unit and the fixed station can then take place.

The carrier frequency change can be carried out by means of a sequence selected from a plurality of predetermined sequences. The check data can then indicate, beyond the position of the carrier frequency of the current time slot in the predetermined sequence, which of the plurality of predetermined sequences is selected and used.

The predetermined sequences can be determined in particular by means of an algorithm (hop algorithm).

It is possible to sense which of the plurality of carrier frequencies is subject to interference. During the logging on of the mobile unit at the fixed station, a carrier frequency which is prescribed by the predetermined sequence is also used if this carrier frequency has been sensed as being subject to interference. After the logging on has been concluded, that carrier frequency of

the predetermined sequence which is subject to interference is passed over during the normal transmission of data. This ensures that during the logging on mode the carrier frequency change prescribed by the predetermined sequence is strictly carried out, in order to ensure that the frequency of the mobile unit is synchronized with that of the fixed station in the sense of logging on.

In particular, the so-called 2.4 GHz ISM frequency band can be used for transmission.

The number of available carrier frequencies can be at least 75 and in particular 96.

In addition, according to the invention an arrangement for wire-free transmission of data between a mobile unit and a fixed station is provided. The fixed station here has an RF module for transmitting the data in time slots on a plurality of carrier frequencies in the sense of a time division multiplex system. A device stores a predetermined sequence in order to define a change of the carrier frequency, for example from one time slot to the next, and outputs this predetermined sequence to the RF module. The data broadcast by the fixed station have check data which indicate the position of the carrier frequency of the current time slot in the predetermined sequence. The mobile unit has a device for determining the position of the carrier frequency of the current time slot in the predetermined sequence by means of the check data.

As an alternative, the check signal can also specify the carrier frequency which the base station will "jump to" next.

As a further alternative, the check data can specify which carrier frequency the base station will use in the m-th time slot or m-th frame. This is advantageous if a mobile unit is in the so-called idle-locked or multiframe mode. In such a mode, a mobile unit resynchronizes with the base station only in every m-th time slot or frame if said mobile unit is not in the process of active voice communication with the base station.

The check data do not have to be broadcast in

every time slot or frame. If a mobile unit which would like to synchronize with a base station receives a time slot or frame which does not contain check data, it scans all the carrier frequencies again, this procedure being
5 repeated until the mobile unit receives from the base station a time slot or frame which contains the check data.

The fixed station can have a switching device for switching over between a logging-on mode, in which a
10 mobile unit, or a further mobile unit, can be logged on at the fixed station, and a normal transmission mode for normal transmission of information data. The check data are broadcast automatically only if the switching device is switched to the logging-on mode.

15 In the normal transmission mode, the check data are not broadcast, or are only broadcast on request.

A plurality of predetermined sequences can be provided in the output device. The check data then have data which go beyond the position data and which indicate
20 the sequence currently in use.

The output device can have a processor which calculates the predetermined sequence by means of an algorithm.

The invention will now be explained in more
25 detail by means of an exemplary embodiment and with reference to the accompanying figures, in which:

Fig. 1 shows an arrangement according to the invention for transmitting data in a wire-free fashion,

30 Fig. 2 shows a time frame of a data transmission standard such as is used in the present invention,

Fig. 3 shows a detailed illustration of a time frame according to the invention, for a carrier
35 frequency, and

Fig. 4 shows a schematic representation of a frequency hopping spread spectrum system.

With reference to Fig. 1, the general design of the arrangement according to the invention for radio transmission will be explained firstly. As is generally customary, the arrangement for the transmission of data by radio has a fixed station 1 and a plurality of mobile units (mobile stations, cable-free telephones) 2, 3, 11. The fixed station 1 is connected here to the landline network with a terminal line 10. The fixed station 1 has an antenna 6 by means of which it is possible to communicate, for example, with the mobile unit 2 via a radio transmission path 8 or with the mobile unit 3 via a radio transmission path 9. The mobile units 2, 3, 11 each have an antenna 7 for receiving and transmitting data.

The internal design of a fixed station 1, insofar as it is of significance for the present invention, will now be explained in more detail. A processor 15 which determines a predetermined sequence by means of a predetermined algorithm (hop algorithm) is provided in the fixed station 1. As an alternative, a plurality of different algorithms may be provided in the processor 15, so that the processor 15 can determine different sequences in accordance with the respectively used algorithm. The sequences determined by the processor 15 are then transmitted to a storage and output device 13. The storage and output device 13 transmits to an RF module 4 either the sequence which is continuously determined by the processor 15 or a sequence which has been previously permanently stored in it.

The RF module 4 receives and transmits data on a carrier frequency f_x which depends on the current value of the sequence transmitted from the storage and output device 13. Therefore, a radio transmission takes place on a carrier frequency f_x , the currently used carrier frequency either being determined indirectly by the processor 15 by means of an algorithm or, alternatively, being determined directly from the value of a sequence

which has been permanently stored in the storage and output device 13.

5 The internal design of a mobile radio unit, insofar as it is relevant to the present invention, will now be described in more detail. In this respect, the design of a mobile radio unit 2, 3, 11 is essentially symmetrical to the internal design of the fixed station 1 described above. That is to say each mobile radio unit 2, 3, 11 has, as illustrated in the invention only for the mobile radio units 2 and 11, a processor 16. This processor 16 determines, by means of one, or alternatively by means of a plurality of available hop algorithms, a sequence which it transmits to a storage and output device 12. The storage and output device 12 transmits to an RF module 5 either the values of the sequence based on the algorithm which are determined continuously by the processor 16 or, alternatively, values of a sequence which has been permanently stored in it. The RF module 5 transmits or receives data on a carrier frequency f_x whose level depends on the value of the sequence transmitted to it by the storage and output device 12. A mobile unit 2, 3, 11 therefore receives or transmits data on a carrier frequency f_x whose level depends either on the current value of the sequence determined by the processor 16 or on the value of a sequence which has been permanently stored in the storage and output device 12.

It is to be noted here that the processor 15 in the fixed station 1 and the processors 16 in the mobile units 2, 3, 11 are based on the same algorithm for determining sequences, or in the event that a plurality of algorithms are available, have the same selection of algorithms. In the event that the sequence is not determined continuously by the processor 15, 16 but rather permanently prescribed in the storage and output devices 12, 13, the sequence which is stored in the storage and output device 13 of the fixed station 1 is of course identical to the sequences which are respectively stored in the storage and output devices 12 of the mobile units

2, 3, 11.

A transmission standard such as is used in the present invention will now be explained with reference to Fig. 2. As is clear in Fig. 2, data are transmitted in chronological succession in a plurality of time slots, 24 time slots Z_x in the case illustrated, using the time division multiplex method TDMA (Time Division Multiple Access) on a plurality of carrier frequencies f_x , of which ten are illustrated. In the case illustrated, duplex mode is used on the carrier frequencies. This means that after the base station has transmitted the first twelve time slots Z_x , it switches to reception and it receives the second twelve time slots (13 - 24) in the opposing direction.

In the event that the so-called DECT Standard is used for transmission, the chronological duration of a time frame is 10 milliseconds, and 24 time slots Z_x are provided, namely twelve time slots for the transmission from the fixed station to mobile units and a further twelve time slots Z_x for the transmission from the mobile units to the fixed station. In the DECT Standard, 10 carrier frequencies f_x between 1.88 GHz and 1.90 GHz are provided.

However, the present invention is also used in particular for transmission in the so-called 2.4 GHz ISM (Industrial Scientific Medical) frequency band. The ISM frequency band has a bandwidth of 83.5 MHz. In accordance with the specification "FCC Part 15" (Federal Communications Commission), at least 75 carrier frequencies must be distributed over these 83.5 MHz. Distributing the 83.5 MHz bandwidth over 96 carrier frequencies, i.e. a channel spacing of 864 kHz, is particularly advantageous.

The abovementioned frequency bands and standards are mentioned purely by way of example. The only fundamental precondition for the invention is that a so-called frequency hopping spread spectrum is used, i.e. a plurality of carrier frequencies are available, and that the carrier frequency f_x selected for the transmission is changed from time to time. A precondition of such a

change is that the data are transmitted in time slots Z_x (time division multiplex method). The so-called DECT Standard as well as any other modified standard based on this DECT Standard, is therefore suitable. A modification can, in this respect, comprise, for example, a reduction (halving) in the number of time slots per frame, as a result of which the bit rate and consequently the necessary basic bandwidth of the transmission can be reduced (halved).

How the selection of a carrier frequency f_x for a specific time slot Z_x is carried out will now be explained with reference to Fig. 4. It will be assumed that, at the time of the time slot Z_1 , the processor 15 of the fixed station 1 determines, on the basis of an algorithm, a value which the RF module 4 of the fixed station 1 converts indirectly into a carrier frequency f_1 . In Fig. 4, the hatching shows that the carrier frequency f_1 is selected at the time of the time slot Z_1 . At the transition from the time slot Z_1 to the following time slot Z_2 , the carrier frequency f_x is inevitably changed. As is illustrated by an arrow in Fig. 4, it is possible, for example, for the processor 15 of the fixed station 1 to determine by means of its algorithm a value which is converted by the RF module 4 into a carrier frequency f_3 . In the same way, a carrier frequency f_2 can then be selected for the time slot Z_3 , which is illustrated by hatching and by an arrow.

In the example above, the case was explained in which the carrier frequency is changed after a time slot in each case. However, for the invention it is only significant that the change of the carrier frequency takes place in each case after a predetermined time period. This may also be, for example, a frame.

The fixed station 1 therefore changes the carrier frequency f_x from the carrier frequency f_1 to the carrier frequency f_3 and then to the carrier frequency f_2 on the basis of the sequence determined by the processor 15. If communication is to take place between the fixed station 1 and a mobile unit 11, it is necessary to ensure that

the mobile unit 11 can follow synchronously the sequence of carrier frequency f_x changes carried out by the fixed station 1. This is a problem in particular when a mobile unit 11 is to be first integrated into a radio transmission system, i.e. has to be logged on and signed on at the fixed station 1. During unsynchronized operation of the new mobile unit 11 after it has been switched on, the mobile unit 11 will change the carrier frequencies f_x used, in the way prescribed by its sequence. The sequence as such is identical here with the sequence 1, which is prescribed in the fixed station 1 and explained above. However, this does not ensure that the sequence of the mobile unit 11 is synchronized with the sequence of the fixed station 1 after said mobile unit 11 has been switched on.

Fig. 3 illustrates how it is ensured according to the invention that the new mobile unit 11 carries out carrier frequency changes which are synchronous with the fixed station 1. As is clear in Fig. 3, the data transmitted in a time slot (channel) Zx are, for the most part, information data, i.e. for example data which represent an item of voice information of a telephone call. Before the range of the information data there is then a check range which is referred to as A field in the DECT Standard. In this check range, data are provided for synchronizing the operation of a mobile unit 11 to be logged on with the operation of the fixed station 1. If a plurality of algorithms are available to the processor 15 in the fixed station 1 for determining the sequence which directly prescribes the changes of the carrier frequency f_x of the fixed station 1, the check range contains data which identify the algorithm currently in use. Further synchronization data contained in the check range are data which indicate which position in the predetermined sequence corresponds to the carrier frequency f_x used for the current time slot Zx . The data of the check range which are illustrated in Fig. 3, namely data which refer to the algorithm used and which refer to the current position of the sequence of the

current algorithm, are broadcast by the fixed station 1 to the mobile unit 11.

As an alternative, the check signal can also specify the carrier frequency which the base station will "jump to" next.

As a further alternative, the check data can specify which carrier frequency the base station will use in the m-th time slot or m-th frame. This is advantageous if a mobile unit is in the so-called idle-locked or multiframe mode. In such a mode, a mobile unit resynchronizes with the base station only in every m-th time slot or frame if said mobile unit is not in the process of active voice communication with the base station.

The check data do not have to be broadcast in every time slot or frame. If a mobile unit which would like to synchronize with a base station receives a time slot or frame which does not contain check data, it scans all the carrier frequencies again, this procedure being repeated until the mobile unit receives from the base station a time slot or frame which contains the check data.

After it has been switched on, the mobile unit 11 scans the available range of carrier frequencies f_x until it senses the carrier frequency f_x currently being used by the fixed station 1. During this sensing of the carrier frequency f_x currently in use, the mobile unit 11 also senses the data of the check range of the data broadcast by the fixed station 1. At first, the mobile unit 11 can therefore determine which algorithm is currently being used by the processor 15 in the fixed station 1, said algorithm, of course, indirectly prescribing the charging of the carrier frequencies of the fixed station 1.

In addition the mobile unit 11 can therefore sense, from the position data of the check range, which position in the predetermined frequency corresponds to the broadcast carrier frequency. The mobile unit 11 is therefore then aware of the algorithm in use and of the

position in the sequence. The mobile unit 11 can then determine independently by means of the position in the sequence, which is known here, as well as the sequence stored in it, which carrier frequency f_x will be used by the fixed station 1 in the following time slot Z_x . From the information fed to it, the mobile unit 11 can therefore generate information for the carrier frequencies to be used in the following time slots Z_x . Thus, it is possible to communicate with the fixed station 1, as is necessary for a signing-on or logging-on procedure. As a result of the information supplied relating to the future carrier frequency change, the mobile unit 11 is therefore then synchronized with the fixed station 1.

The fixed station 1 can have a switching device 14 which can be switched between two positions, namely a position in the logging-on mode R and a position corresponding to the normal transmission mode. Only if the switching device 14 is switched to logging-on mode R does the fixed station 1 automatically broadcast the check range data necessary for synchronization with a mobile unit to be newly logged on, this data being namely the information relating to the algorithm in use and the information relating to the position in the predetermined frequency on the basis of the algorithm. If the switching device 14 is switched to the normal transmission mode N, the aforesaid synchronization data are normally not broadcast, that is only broadcast on request from a mobile unit.

A problem when logging on a further mobile unit 11 can result from a so-called noise source fall-back mode. Firstly, it will be explained what action the fixed station 1 takes in accordance with this noise source fall-back mode with regard to the carrier frequency selection. With reference to Fig. 4 it is clear that at the time of the time slot Z_3 the carrier frequency f_2 is indicated by the predetermined frequency. It will now be assumed that the predetermined sequence for the time of the time slot Z_4 indicates a change to the carrier frequency f_4 . In addition, it will be assumed that, for

example in the preceding time frame of the transmission, the fixed station 1 has determined that interference occurred during a transmission on the carrier frequency f_4 . This interference may result, for example, from the fact that another radio transmission arrangement is adversely affecting this carrier frequency f_4 . If the fixed station 1 is in the so-called noise source fall-back mode, when selecting the carrier frequency f_x for the time slot Z4 it will not select the carrier frequency f_4 which is, of course, actually prescribed by the predetermined frequency. The carrier frequency f_4 which is sensed as being subject to interference is instead passed over and another carrier frequency f_x , for example the carrier frequency f_x which follows in the predetermined frequency, is selected for the time slot Z4 (as illustrated by the arrow P_1). In the case illustrated in Fig. 4, the carrier frequency selected for the time slot Z4 is therefore not the carrier frequency f_4 which is sensed as being subject to interference but instead the carrier frequency f_1 which is sensed as being free of interference.

Even if this noise source fall-back mode has, of course, large advantages during the radio transmission mode with mobile units 2, 3 which have already been integrated, it is clear that this noise source fall-back mode simultaneously causes large problems for the logging on of a new mobile unit 11. The mobile unit 11 will, in fact, determine, on the basis of the algorithm stored in it and the position of the carrier frequency, known to it from the check range of the data transmitted from the fixed station, in the predetermined sequence in accordance with the algorithm at the time of the time slot Z3, that a transmission on the carrier frequency f_4 will take place starting from the next value of the sequence at the time of the time slot Z4. However, if, owing to the noise source fall-back mode, the fixed station 1 selects the carrier frequency f_1 at the time of the time slot Z4 in order to avoid the carrier frequency f_4 which is subject to interference, and at the same time the mobile unit 11

to be logged on selects, on the basis of the information available to it, the carrier frequency f_4 at the time of the time slot Z4, synchronization of the operation of the fixed station 1 with that of the mobile unit 11 fails.

5 If, for this reason, the logging-on mode R is selected by the switching device 14 in the fixed station 1, the noise source fall-back mode of the fixed station 1 is simultaneously switched off. This means that, in contrast with the normal mode in which, as stated above, the fixed
10 station 1 will, in order to avoid the carrier frequency f_4 which has been recognized as being subject to interference, switch, in a position of the switching device 14 in logging-on mode R, to the carrier frequency f_4 at the time of the time slot Z4 as is prescribed by the sequence
15 on the basis of the algorithm of the processor 15, although the fixed station 1 is aware that the carrier frequency f_4 is subject to interference. The change of the carrier frequency f_x from time slot Z3 to time slot Z4 is illustrated in Fig. 4 by the unbroken arrow P_2 . As
20 a result of the fact that the noise source fall-back mode of the fixed station 1 is simultaneously switched off when the switching device 14 is positioned in logging-on mode R, it is therefore ensured that a synchronization of the operation of the mobile unit 11 with that of the
25 fixed station 1 can take place. After the signing-on procedure or logging on of the mobile unit 11 at the fixed station 1 has been completed, the switching device 14 is then switched back from the logging-on mode R to the normal transmission mode N, which can take place in
30 an automated way, and the noise source fall-back mode can thus be switched on again automatically.

However, the noise source fall-back mode can also remain switched on during the signing-on procedure. In this context, it is to be noted that, in accordance with
35 the exemplary embodiment, 96 carrier frequencies are provided, of which a maximum of 21 can be locked out, in order to avoid infringing the US-American Specification "FCC part 15". Therefore, the mobile unit knows the majority of carrier frequencies used, even in the noise

source fall-back mode. Thus, if communication does not come about between the mobile unit and the fixed station in a frame owing to a frequency lock-out which is not known to the mobile unit, in all probability it will be possible to resume communication in the next frame with a new carrier frequency.

Therefore, according to the invention, a method and a device for ensuring synchronism during the initial logging on of a new mobile unit at a fixed station is provided with a so-called frequency hopping spread spectrum system on a time division multiplex basis.

List of reference symbols

- 1: Fixed station
2: Mobile unit (cable-free telephone)
3: Mobile unit
5 4: RF module (in the fixed station)
5: RF module (in the mobile unit)
6: Antenna (in the fixed station)
7: Antenna (in the mobile unit)
8: First radio transmission path
10 9: Second radio transmission path
10: Terminal line
11: Mobile unit
12: Output device (in the mobile unit 11)
13: Output device (in the fixed station 1)
15 14: Switching device
15: Processor (in the fixed station)
16: Processor (in the mobile unit)
 f_x : Carrier frequency
 Z_x : Time slot
20 P_1 : Frequency change (noise source fall-back mode on)
 P_2 : Frequency change (noise source fall-back mode off)

001620 22958460

Patent Claims

1. Method for logging on a mobile unit (11) at a fixed station (1) for a transmission of data by radio, in which method the data are transmitted in time slots (Z_x) on a plurality of carrier frequencies (f_x) and the mobile unit (11) and the fixed station (1) change the carrier frequency (f_x) after a predetermined time period in accordance with a predetermined sequence, characterized in that the fixed station (1) broadcasts check data which indicate the position of the carrier frequency (f_x) of the current time slot (Z_x) in the predetermined sequence, and the mobile unit (11) determines (12) the position of the carrier frequency (f_x) of the current time slot (Z_x) in the predetermined sequence by means of the check data.
2. Method according to Claim 1, characterized in that the check data are transmitted automatically during a logging-on mode.
3. Method according to one of the preceding claims, characterized in that, in order to define the carrier frequency change, one of a plurality of predetermined sequences is selected and the check data broadcast by the fixed station (1) continue to indicate which of the plurality of predetermined sequences is used by the fixed station (1).
4. Method according to one of the preceding claims, characterized in that the predetermined sequences are determined (15) by means of an algorithm.
5. Method according to one of the preceding claims, characterized in that

it is sensed which of the carrier frequencies (f_x) is subject to interference, and during the logging on of the mobile unit (11) a carrier frequency (f_4 , Fig. 4) which is prescribed by the predetermined sequence is used (P_2) if this carrier frequency (f_4 , Fig. 4) of the predetermined sequence is passed over (P_1)

5

6. Method according to one of the preceding claims, characterized in that the 2.4 GHz ISM frequency band is used for transmission.

10

7. Method according to one of the preceding claims, characterized in that the number of available carrier frequencies (f_x) is at least 75 and in particular 96.

15

8. Arrangement for wire-free transmission of data between a mobile unit (2, 3, 11) and a fixed station (1) in time slots (Z_x) on a plurality of carrier frequencies (f_x), the fixed station (1) and the mobile unit (11) each having:

20

- a device (12, 13) for outputting a predetermined sequence which prescribes the carrier frequencies (f_x) of the time slots (Z_x), the carrier frequency changing after a predetermined time period, and

- an HF module (4, 5) for transmitting the data in the time slots (Z_x) whose carrier frequencies (f_x) are each prescribed by the output device (12, 13) by means of the predetermined sequence,

characterized in that

the data broadcast by the fixed station (1) have check data which indicate the position

25

of the carrier frequency (f_x) of the current time slot (Z_x) in the predetermined sequence.

9. Arrangement according to Claim 8,

characterized in that

5 10. Arrangement according to one of Claims 8 or 9,

the output devices (13, 16) each have a plurality of predetermined sequences, and the check data continue to contain data which indicate the sequence currently in use by the fixed station (1).

characterized in that

the output devices (12, 13) each have a processor (15, 16) which calculates the predetermined sequence or sequences by means of an algorithm.

characterized in that

the carrier frequencies (f_x) lie in a 2.4 GHz ISM radio band.

Abstract

Method and arrangement for logging on a mobile unit at a fixed station

The present invention provides a method and an arrangement for the wire-free transmission of data between a mobile unit (2, 3, 11) and a fixed station (1) in time slots (Z_x) on one of a plurality of carrier frequencies (f_x). The fixed station (1) and the mobile unit (11) each comprise here a device (12, 13) for outputting a predetermined sequence which prescribes the carrier frequencies (f_x) of the time slots (Z_x), the carrier frequencies of two successive time slots being different, and an RF module (4, 5) for transmitting the data in time slots (Z_x), the carrier frequencies (f_x) of the time slots (Z_x) each being prescribed by the predetermined frequency of the output device (12, 13).

Figure 1

00445566-00000000

09/485662

-1-

BOX PCT

IN THE UNITED STATES ELECTED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5 APPLICANT(S): Jürgen Kockmann, et al DOCKET NO: P00,0316
SERIAL NO: 09/485,662 GROUP ART UNIT:
FILED: February 14, 2000 EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/DE97/01750

INTERNATIONAL FILING DATE: 14 August 1997

10 INVENTION: **METHOD AND SYSTEM FOR LOGGING ON A MOBILE
UNIT AT A FIXED STATION**

Assistant Commissioner for Patents,
Washington, D.C. 20231

SUBMISSION OF PROPOSED DRAWING MODIFICATIONS

15 Enclosed are 2 sheets of translated drawings, Figures 1-4, filed in
response to the Notice of Defective Translation, in which the drawings were
originally filed with the German language. Approval of the translation is
respectfully requested.

Respectfully submitted,

20



(Reg. No. 45,877)

Mark Bergner
SCHIFF HARDIN & WAITE
PATENT DEPARTMENT
6600 Sears Tower
Chicago, Illinois 60606-6473
(312) 258-5779
Attorneys for Applicant

25

1/2

FIG 1

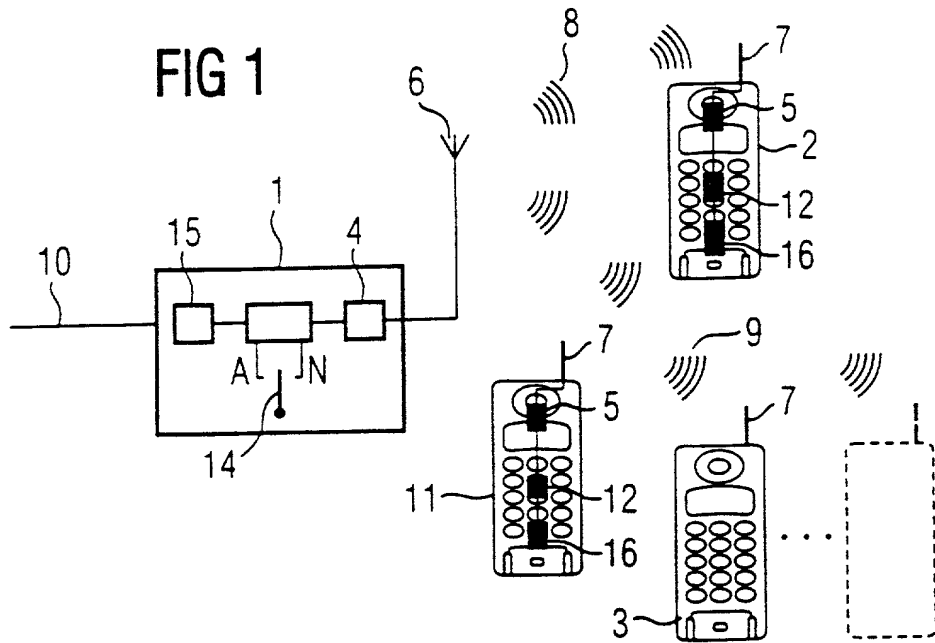


FIG 2

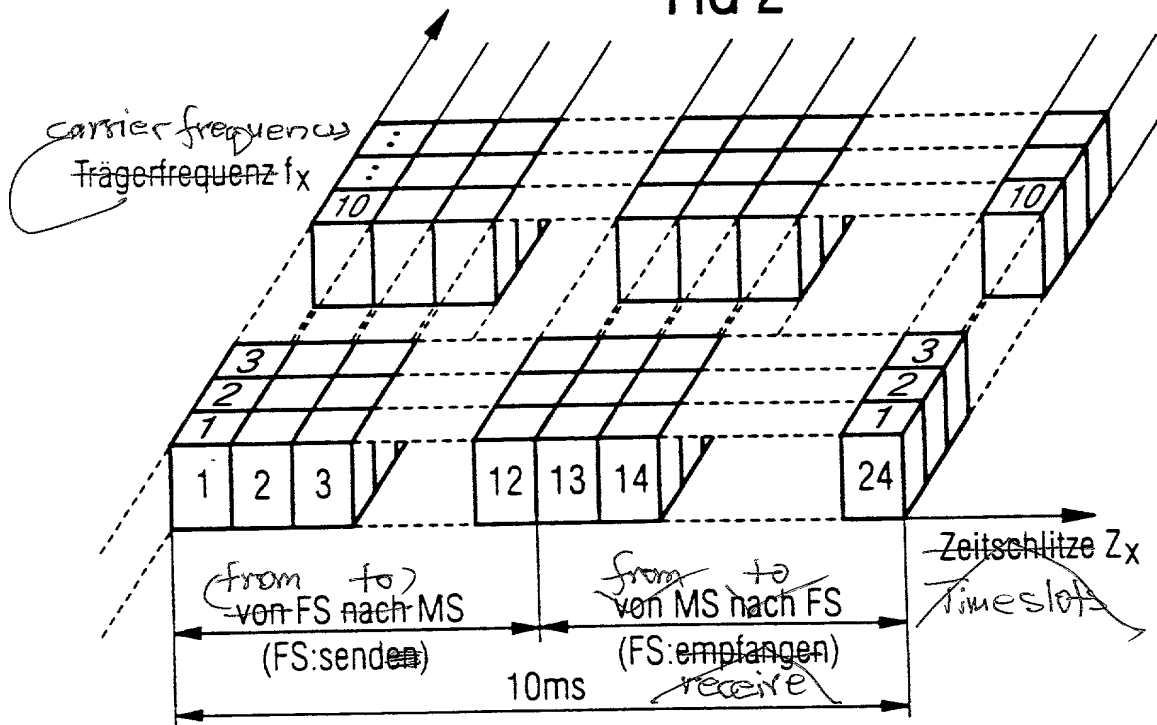


FIG 3

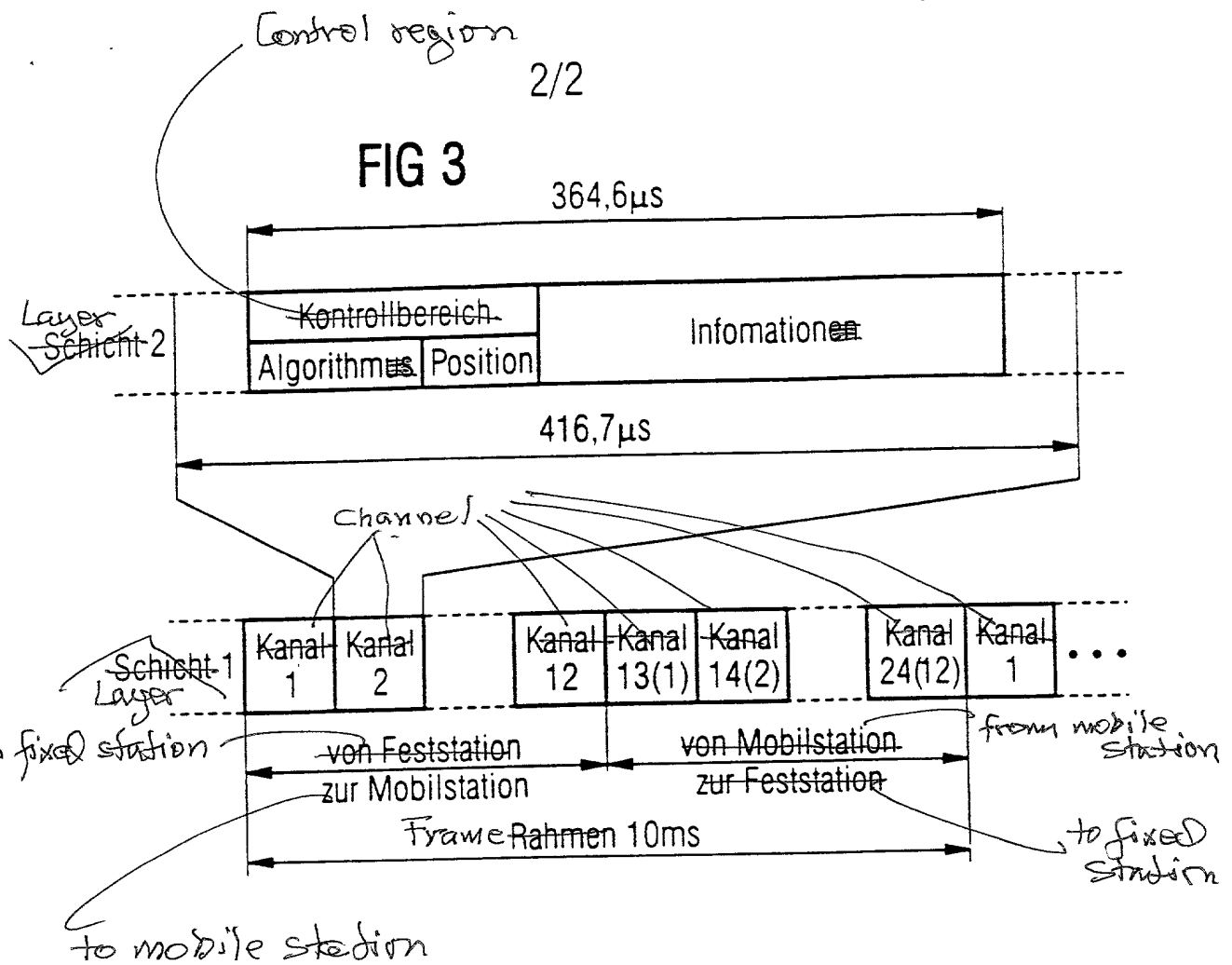
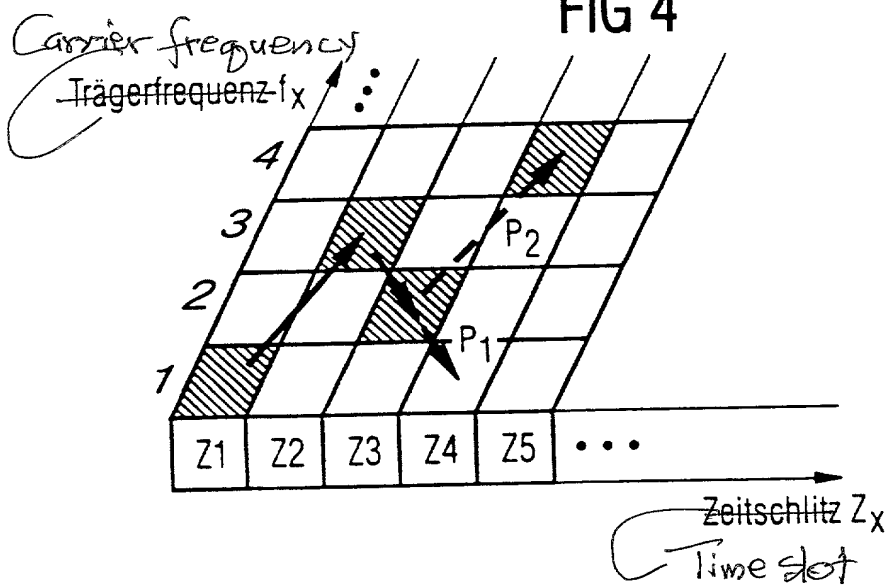


FIG 4



Patent and Trademark Office-U.S. DEPARTMENT OF COMMERCE

German Language Declaration

Prior foreign applications
Priorität beansprucht

Priority Claimed

PCT/DE97/01750 Germany (WO) 14. August 1997
(Number) (Country) (Day Month Year Filed)
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☒ ☐
Yes No
Ja Nein

(Number) (Country) (Day Month Year Filed)
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

(Number) (Country) (Day Month Year Filed)
(Nummer) (Land) (Tag Monat Jahr eingereicht)

☐ ☐
Yes No
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgegeben)

(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date)
(Anmeldedatum)

(Status)
(patentiert, anhängig,
aufgeben)

(Status)
(patented, pending,
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden können, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: (Name und Registrationsnummer anführen)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

And I hereby appoint
Messrs. John D. Simpson (Registration No. 19,842) Lewis T. Steadman (17,074), William C. Stueber (16,453), P. Phillips Connor (19,259), Dennis A. Gross (24,410), Marvin Moody (16,549), Steven H. Noll (28,982), Brett A. Valiquet (27,841), Thomas I. Ross (29,275), Kevin W. Gynn (29,927), Edward A. Lehmann (22,312), James D. Hobart (24,149), Robert M. Barrett (30,142), James Van Santen (16,584), J. Arthur Gross (13,615), Richard J. Schwarz (13,472) and Melvin A. Robinson (31,870), David R. Metzger (32,919), John R. Garrett (27,888) all members of the firm of Hill, Steadman & Simpson, A Professional Corporation.

Telefongespräche bitte richten an:
(Name und Telefonnummer)

Direct Telephone Calls to: (name and telephone number)

See enclosed change of address for new phone number
312/876-0200
Ext. _____

Postanschrift:

Send Correspondence to:

HILL, STEADMAN & SIMPSON
A Professional Corporation
85th Floor Sears Tower, Chicago, Illinois 60606

See enclosed change of address

Voller Name des einzigen oder ursprünglichen Erfinders.		Full name of sole or first inventor:	
KOCKMANN Jürgen			
Unterschrift des Erfinders	Datum	Inventor's signature	Date
<i>X Jürgen Kockmann</i>	<i>X 8/14/00</i>		
Wohnsitz		Residence	
D-40489 Düsseldorf, Germany DEX			
Staatsangehörigkeit		Citizenship	
Bundesrepublik Deutschland			
Postanschrift		Post Office Address	
Albrecht-Dürer-Str. 16			
D-40489 Düsseldorf			
Bundesrepublik Deutschland			
Voller Name des zweiten Miterfinders (falls zutreffend):		Full name of second joint inventor, if any:	
SYDON Uwe			
Unterschrift des Erfinders	Datum	Second Inventor's signature	Date
<i>X Uwe Sydon</i>	<i>X 08-15-00</i>		
Wohnsitz		Residence	
D-40474 Düsseldorf, Germany DEX			
Staatsangehörigkeit		Citizenship	
Bundesrepublik Deutschland			
Postanschrift		Post Office Address	
Rosspfad 7			
D-40474 Düsseldorf			
Bundesrepublik Deutschland			

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

CHANGE OF ADDRESS OF APPLICANTS' REPRESENTATIVE

APPLICANT(S): Jürgen Kockmann
ATTORNEY DOCKET NO: P00,0316
INTERNATIONAL APPLICATION NO.: PCT/DE97/01750
INTERNATIONAL FILING DATE: August 14, 1997
INVENTION: **METHOD AND SYSTEM FOR LOGGING ON A MOBILE UNIT
AT A FIXED STATION**

Serial No. 09/485,662
Filed: February 14, 2000


Assistant Commissioner for Patents,
Washington, D.C. 20231

S I R:

Members of the firm of Hill & Simpson designated on the original Power of Attorney have merged into the firm of Schiff Hardin & Waite. All future correspondence for the above-referenced application therefore should be sent to the following address:

SCHIFF HARDIN & WAITE
Patent Department
6600 Sears Tower
Chicago, Illinois 60606-6473

Submitted by,

 (Reg. No. 45,877)
Mark Bergner
SCHIFF HARDIN & WAITE
Patent Department
6600 Sears Tower
Chicago, Illinois 60606-6473
Telephone: (312) 258-5779
Attorneys for Applicants

09/485662